ECE664 Applied Advanced Control Systems Fall, 2025

Prerequisite: Undergraduate courses in control systems/signals & systems.

Required Background:
1. Knowledge of signals/systems representations and analyses.
2. Concept of block diagrams and feedback control systems.
3. MATLAB/Simulink programming skill.

Instructor: Dr. Biao Cheng, Department of Electrical & Computer Engineering
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Office Hours: TBD

A. Tentative Schedule:

Module	Date	Topic
01	09/02 – 09/05	Introduction to Control Systems.
02	09/06 – 09/12	Introduction to MATLAB & Simulink.
03	09/13 – 09/19	Sampling and Reconstruction.
04	09/20 – 09/26	Review of Z-Transform.
05	09/27 – 10/03	Solution of Difference Equations.
06	10/04 – 10/10	Coordinate Transformation & Delay Modeling.
07	10/11 – 10/17	Discrete Time Control Systems.
Midterm Exam	Friday, 10/24	6:00pm – 9:00pm ET.
08	10/25 – 10/31	Discrete Time Control Algorithms I.
09	11/01 – 11/07	Discrete Time Control Algorithms II.
10	11/08 – 11/14	Practical Design Issues.
11	11/15 – 11/21	Case Study.
12	11/22 – 11/28	Summary and Review.
Project Due	12/02 – 12/05	Tuesday, 12/02, submit presentation by 11:59pm. Friday, 12/05, submit project report by 11:59pm.
Final Exam	Friday, 12/12	6:00pm – 9:00pm ET.

B. Grading Scheme:

Midterm	Final	Assignment	Project
25%	25%	20%	30%

C. Text: Lecture notes.

D. Reference:
1. Åström, Karl J., and Wittenmark, B. *Computer-controlled Systems: Theory and Design*. 3rd ed. Mineola, N.Y.: Dover Publications, 2011. ISBN: 978-0486486130 (eBook and Paperback)
2. Lewis, F., *Applied optimal control & estimation: Digital design & implementation*. Englewood Cliffs, N.J.: Prentice Hall. 1992. ISBN: 978-0130403612
3. Vegte, J., *Feedback control systems* 3rd ed. Englewood Cliffs, N.J.: Prentice Hall. 1994. ISBN: 978-0130163790

E. Important Dates:

Friday, 10/24	Midterm Exam
Tuesday, 12/02	Project presentation materials due by 11:59pm
Friday, 12/05	Project report due by 11:59pm
Friday, 12/12	Final Exam

F. Required Software: MATLAB, MathWorks Inc. (free NJIT web site download: ist.njit.edu)

G. AI Policy:

This course expects students to work without artificial intelligence (AI) assistance in order to better develop their skills in this content area. As such, AI usage is not permitted throughout this course under any circumstance.

NJIT Honor Code will be upheld, and that any violations will be brought to the immediate attention of the Dean of Students.